From: Tim Larson <tjlarson@gw.dec.state.ny.us>
To: Donald Hesler <djhesler@gw.dec.state.ny.us>
Date: 9/24/99 12:38pm
Subject: Onondaga Lake - Additional Sampling

Attached is the latest version of the text and table that was presented by TAMS at our meeting in New Paltz earlier this year. The figure associated with the text and table is the same figure (Plate 1) presented at the New Paltz meeting. As you know from my email sent to you earlier today, we are attempting to set up a meeting with Allied during the week of October 4th. Therefore, I would like you to forward any comments you may have to me by noon on September 29th, such that I can incorporate the changes and provide a copy of our proposed sampling program to Allied prior to us meeting with them. If you have any questions relating to this request, please contact me.
Thanks,

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Data Needs for Completion of the Onondaga Lake Remedial Investigation/Feasibility Study
(September 24, 1999 Version)

The following outlines the data needs for completing the Onondaga Lake Remedial Investigation/Feasibility Study. A summary table is provided which presents the proposed sampling needs by matrix.

Data Needs for the Ecological Risk Assessment

a) Near-shore sediment samples, 0-15 cm (0-6") and 15-30 cm (6-12"), should be collected at approximately 30 locations with 5 co-located samples and 2 split samples to assist in determining sample station and sampling variability. The analysis should include: full TCL/TAL (including PCB Aroclor 1268), dioxins/furans, and other stressors of concern (SOCs) as well as TOC and grain size. Approximately 15% of PCB analyses should be performed by congener analysis to determine PCB/dioxin TEQ risks to fish and wildlife and assess the validity of past Aroclor identifications. Samples should be collected near the lake shoreline out to a maximum depth of 4.5 meters (see Plate 1). The sediment samples should be collected at varying water depths along the shoreline from one meter in-depth to 4.5 meters in-depth. *Reason: lack of spatial coverage along the lake shoreline near AlliedSignal sources and other potential sources. In addition, there are unknown potential levels of dioxin contamination in lake sediments and associated potential risks to fish and wildlife as well as unquantified potential PCB TEQ risks.*

b) As a follow-up to the wetlands survey that was conducted earlier this year, further evaluation and chemical analysis of wetlands within the Onondaga Lake System will be necessary. Sediment samples, 0-15 cm (0-6") and 15-30 cm (6-12"), in lake-connected wetlands should be collected to examine the potential for transport of AlliedSignal wastes into federal/state wetlands as required under CERCLA/SARA. The analysis should include: full TCL/TAL (including PCB Aroclor 1268), dioxins/furans, other SOCs, and TOC. At this point, without having performed a federal and state delineation of wetlands around the lake, the NY State Freshwater Wetlands maps and the US Department of the Interior National Wetlands Inventory (NWI) maps, as well as aerial photos, soil survey maps, and the results of the recent field reconnaissance should be used to determine the general areas to be sampled. Potential wetlands that may require investigation include those near AlliedSignal source areas, including designated state wetlands adjacent to the East Flume/Harbor Brook (SYW 19) and Ninemile Creek (SYW 10) as well as areas near Ley Creek (SYW 12) and the northwest corner of the lake (SYW 6). A possible sampling design may include a transect of stations in a channel connecting the lake to the wetland as well as a transect from the channel into the wetland soils/sediment. If elevated levels of contamination were found, additional sampling and a wetlands assessment would be required. *Reason: Fill in data gaps concerning potential impacts to lake wetlands and to fulfill FWIA and CERCLA requirements to determine the nature and extent of contamination as well as the requirements in NYSDEC's July 3, 1996 letter to AlliedSignal.*

c) Fish tissue analysis for methylmercury, TAL metals, pesticides/PCBs (including PCB Aroclor 1268), chlorinated benzenes, dioxins/furans, and percent lipids should be conducted. PCB analyses should be performed by congener analysis to determine PCB/dioxin TEQ risks to fish and wildlife and assess the validity of past Aroclor identifications. These fish should be collected from two areas in the lake near known source areas, including near the mouth of Ninemile Creek and near the shore from Tributary 5A to Harbor Brook. It is recommended that the following number of samples be collected for analysis from each area: five channel catfish, five carp and five white perch. Fish collected for BERA purposes should be analyzed on a whole-basis. For larger fish that may be eaten (including scavenged) by other organisms, both standard fillet and the entire remainder of the body should be analyzed separately, and whole body concentrations determined using a weighted average of the fillet and the remainder of the body. In addition, forage fish from each tributary mouth (*i.e.*, Ninemile Creek, East Flume, Ley Creek, Harbor Brook, Onondaga Creek, Sawmill Creek, and Bloody Brook) consisting of three composites of 25 to 100 grams each of two to three species should be collected for the above analyses. All fish should be weighed to the nearest 0.1 gram and measured for standard length. Collection, chain of custody and handling protocols should be consistent with the current version of NYSDEC's "Fish Collection and Handling Procedures" by Dr. Ron Sloan. The NYSDEC should be provided with the name of the laboratory performing the mercury analyses. *Reason: Fill in data gaps of fish size ranges for wildlife exposure analysis, reduce uncertainty in extrapolating fish fillet data to whole-body concentrations, determine dioxin/furan and chlorinated benzene levels of contamination to better define potential risks to fish and wildlife.*

d) Chronic 28-day growth and reproduction whole sediment toxicity tests should be performed using Hyalella azteca following ASTM E 1383 methodology. Based on lake sediment carbonate levels, a flow-through test should be considered. This should include a minimum of 15 sediment samples (5 highly contaminated, 5 moderately contaminated, 5 low contaminated samples) plus 3 co-located samples for in-station variability. Sediment chemistry should be determined at the time of testing. *Reason: Need to assess chronic sediment toxicity to aid in the completion of the Ecological Risk Assessment Report.*

Data Needs for the Human Health Risk Assessment

Near-shore sediment samples should be collected from each of the locations where shallow (shoreline area) surface water samples will be collected this Fall. The rationale for this is that these might represent the most likely exposure points. These sediment samples should be taken in shallow water (perhaps a foot or less depth, the area in which children, including young non-swimmers, might be most likely to wade and play). At each location a 0-15 cm core segment should be collected and then split into two samples for analysis: 0-2 cm and 0-15 cm aliquots. A third segment (15-30 cm) should also be analyzed (see FS sampling discussion). (Two co-located cores could be taken if this subdivision scheme did not prove practical.) The 0-15 cm, 0-2 cm and 15-30 cm samples should be analyzed for all COCs currently under consideration.1 Grain size distribution and TOC should also be performed on the sediment samples. *Reason: These data will provide direct information to be used in a near-shore sediment exposure*

scenario, such as bathing or wading. Additional support for the collection of the 15-30 cm segment is provided under the FS sampling needs.

Feasibility Study Data Needs

a) Sediment Coring. In a number of the more contaminated near-shore areas, the 1992 core depths are not sufficient to characterize the depths to which remediation (*e.g.*, dredging) might need to occur. In particular, the near-shore area (out to the 9 m contour) of the south basin and the Ninemile Creek delta show elevated levels at depth, *i.e.,* the maximum level in the cores occurs in the bottom segment for several contaminants, including mercury. In these locations, coring should be done to at least 8 meters, given the apparently high deposition rate, so as to define the vertical extent of contamination. The need for this depth is based on a review of the sediment core data. The data for chlorobenzenes and mercury indicate that high contamination levels as deep as 180-210 cm are present in these areas. For mercury and chlorobenzene, concentrations in the bottom segment in many of the cores in these areas are above NYSDEC sediment criteria (1.3 ppm Severe Effect Level for mercury and 3.5 ppm-oc [or 35 ppb-dry at 1% TOC or 350 ppb-dry at 10% TOC] Benthic Aquatic Life Chronic Toxicity for chlorobenzene). In addition, the high resolution core profile near Ninemile Creek (AlliedSignal station S85) exhibits a mercury peak at 250 cm. As the sediment core was collected in 1992 and assuming that this mercury peak represents 1972, this would yield a deposition rate of 12.5 cm/year. This would place the mid-1940s deposition horizon (the initiation of mercury use) at roughly 7m below the sediment-water interface in 1999. Without this information it is possible that dredging in these areas, should dredging be selected as the final remediation alternative, might leave behind higher surface sediment contaminant levels than those removed (*i.e.,* dredging might remove the less contaminated, shallow sediments, leaving the more contaminated deeper sediments at the surface; alternatively, if dredging to a depth where concentrations remain above the cleanup goal is performed, then containment/capping might be necessary to supplement dredging of the surficial sediments).

These samples should be analyzed for the COCs, TOC, and grain size distribution, with approximately 10 percent analyzed for the complete TCL since no sampling has been done to the greater depths required here. The proposed sampling intervals for these cores are shown on Plate 1. In addition, a limited number of samples need to be analyzed for TCLP using Method 1311 from SW-846. *Reason: This information will be used to aid in determining the nature and extent of contamination, and to assess and calculate potential remedial (e.g., dredging) needs and volumes, as well as potential sediment disposal costs.*

Based on a review of the available information, the two lake center high resolution (stratigraphy) cores show a strong similarity of deposition rate and mercury composition in the deep portions of the north and south basins. Both of these cores show low levels of mercury (less than 1 ppm) below approximately 100 cm. The majority of the cores collected in the deeper areas of the lake (greater than 9 m water depth) were sampled for mercury down to 120 cm or 150 cm. The maximum concentration of mercury in each core was not detected in the bottom segment. Mercury concentrations in the bottom

segment of these cores were generally less than 1 to 3.3 ppm. Thus, the existing number of cores are sufficient to characterize the vertical extent of mercury contamination in these areas and no additional sediment sampling is anticipated in the deep portions of the lake at this time (unless sampling of the near-shore areas was to result in the addition of COCs that were not analyzed for in the deep cores).

b) Supplemental Sediment Coring. In those locations occupied for the HHRA and BERA sampling, all cores should be extended to the likely depth of contamination. In this manner, if sediment removal was necessary, the appropriate depth of removal could be determined without further sampling. For locations on the north and eastern shores, sediment contamination appears limited to the top 60 cm. In the additional locations in these areas, all sediment cores should be advanced to this depth, with the sampling intervals comparable to that previously used by AlliedSignal (30 cm) and required herein for the risk assessments (*i.e.*, 0 to 15 cm, 15 to 30 cm, and 30 to 60 cm). Sampling from the Ninemile Creek delta and portions of the south basin should be advanced to 8 meters, based on the frequently high rates of deposition in these areas. The proposed sampling intervals for these areas and the remaining portions of the lake are indicated on Plate 1. These samples should be analyzed for all COCs currently under consideration, TOC and grain size distribution. *Reason: This information will be used to confirm the applicability of the previous findings (1992) in areas which have not been sampled as well as to support the consideration of removal depths, if required.*

Considerations

Options for potentially reducing the costs of the analytical program for the additional sampling proposed for the Onondaga Lake BERA, HHRA, and FS were considered. One approach to reducing the number of analyses would be to put some of the samples on hold (this process has been referred to as "archiving") at the laboratory while others were analyzed, reported, and the data reviewed. The review of the data would determine which, if any, of the remaining samples would be analyzed. In order to meet holding times, however, other costs would be incurred, as noted below.

- Volatile organics - these analyses have a 10 to 14 day holding time; therefore, the first set of analyses would have to be analyzed on an accelerated schedule (5 to 7 day turnaround time). This would entail a 25 to 30% surcharge (for 7 day turnaround; 50% for 48 hour turnaround).
- Semivolatiles and pesticides/PCBs - samples for these analyses have to be extracted within 5 to 7 days. The availability of 48 hour turnaround for these analyses is uncertain at best; so for these analyses all samples would have to be extracted, with only the extracts of the pre-designated subset analyzed initially. The extracts have a 40 day holding time, so the initial analyses would not have to be analyzed at an accelerated turnaround time. A Standby subcontractor laboratory indicated that their charge for extraction of samples which were not eventually designated for analysis would be 50% of the analytical cost for the parameter for which the extraction was performed; so for sediment samples, the cost of extracting samples which were not eventually selected for analysis would be about $140 for semivolatiles and $80 for pesticides/PCBs.
- Metals have a holding time of six months, except for mercury which is 26 days

from collection. In order to guarantee analysis, reporting, and review of mercury data in time to determine which additional samples to analyze, 14 day turnaround, at a surcharge of about 10%, would be necessary for the samples initially analyzed.

Field screening was also considered. There are several concerns with field screening, which include the availability of screening methods for all the COCs, and the ability to screen for those COCs at sufficiently low concentrations. Field screening is thus not recommended at this time.

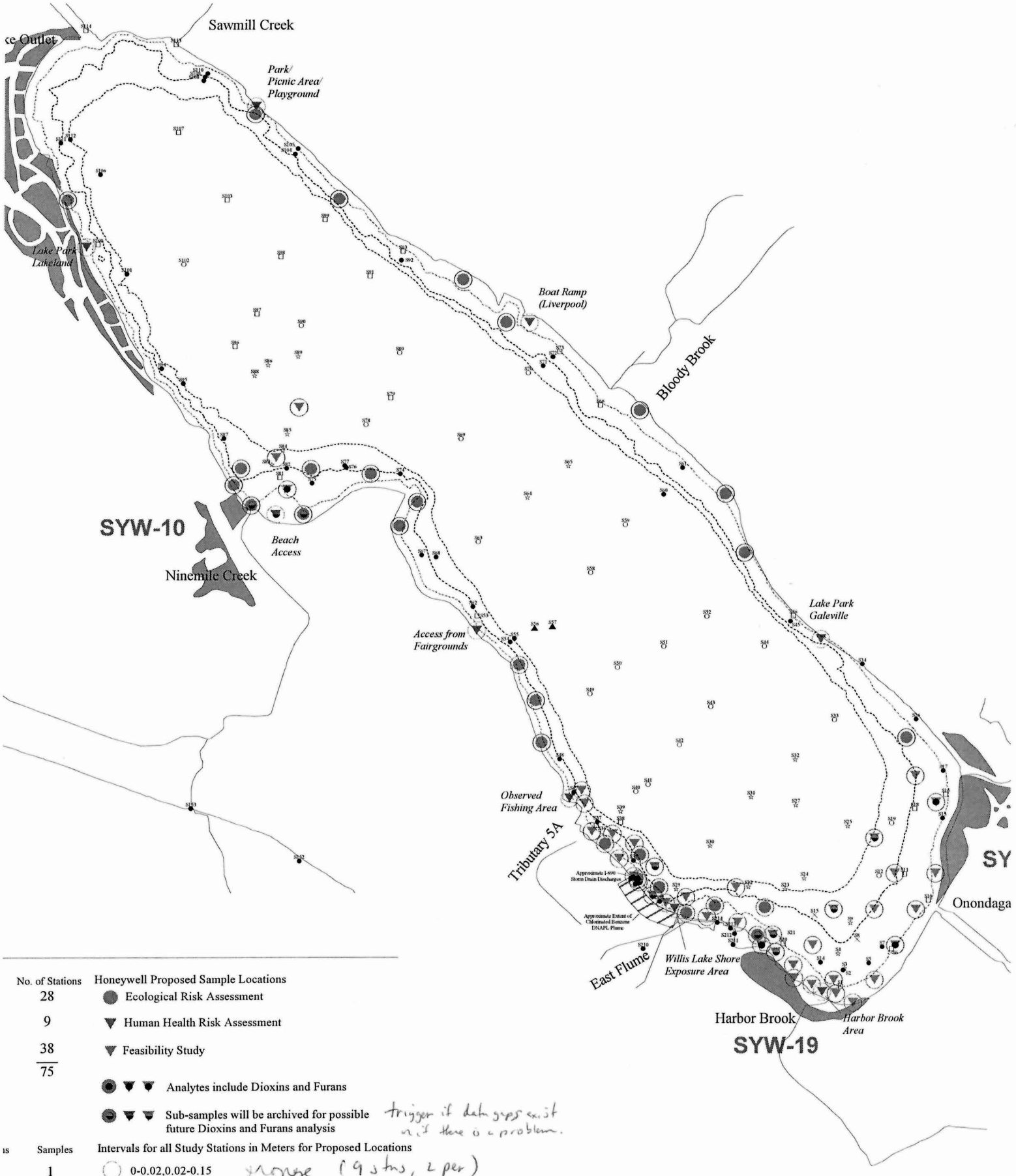
Also, a phased approach to sediment sample collection and analysis could be considered. A subset of the cores (at least 50%) from the near-shore areas, Ninemile Creek delta, and the south basin could be collected and analyzed for all COCs at the depths specified herein. The review of the data would determine if the total number of samples could be reduced by either eliminating certain stations, eliminating some of the deeper segments, or eliminating certain parameters. Concurrence from NYSDEC would be required prior to eliminating samples and completion of field work.

NYSDEC would like to discuss these options with AlliedSignal at an upcoming meeting to attempt to reduce the costs of the proposed sampling program without compromising the objectives.

Onondaga Lake RI Sampling Summary - Proposed Samples (DRAFT)

Matrix	Program	Setting			Samples Required	
			Stations	Co-Locates	Splits/ Dups	Total Cores
Sediment						
	BERA					
		Lake	30	5	2	37
	HHRA					
		Lake	9	1		10
	FS	Ninemile Creek Delta and				
		South Basin Near-Shore	34	5	4	43
		South Basin Near-Shore	11	2	1	14
		Subtotal:	84			104
Fish						
	BERA	Large Fish - Two Lake Areas	2			2
		Forage Fish Composites - Tribs	7			7
		Subtotal:	9			
Sediment Toxicity						
	BERA		15	3		18
		Subtotal:	15	3		18

Samples/ Core	Total Samples
2	74
1	10
10	430
7	98
	612
15	30
3	21
	51
1	18
	18



No. of Stations	Honeywell Proposed Sample Locations
28	Ecological Risk Assessment
9	Human Health Risk Assessment
38	Feasibility Study
75	

Analytes include Dioxins and Furans

Sub-samples will be archived for possible future Dioxins and Furans analysis — trigger if data gaps exist or if there is a problem.

ıs Samples	Intervals for all Study Stations in Meters for Proposed Locations
1	0-0.02,0.02-0.15 — orange (9 stns, 2 per)
2	0-0.15,0.15-0.3 — blue
4	0-0.15, 0.15-0.3, 0.3-1.0,1.0-2.0 — green
10	0-0.15, 0.15-0.3, 0.3-1, 1-2. 2-3, 3-4, 4-5, 5-6, 6-7, 7-8 — red

ıposed sediment samples (excluding splits, co-locates and QA/QC)

404 including wetlands

Honeywell Stations with Depth in cm

● 0 - 2